REMARKS/ARGUMENTS

Claims 1-19 were previously pending in the application. New claims 20-21 are added herein. Assuming the entry of this amendment, claims 1-21 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

In paragraph 3 of the office action, the Examiner rejected claims 1-2, 4-7, 9-10, 12-15, and 18-19 under 35 U.S.C. 103(a) as being unpatentable over Brueske in view of Younis. In paragraph 4, the Examiner objected to claims 3, 8, 11, and 16-17 as being dependent upon a rejected base claim, but indicated that those claims would be allowable if rewritten in independent form. For the following reasons, the Applicant submits that all of the now-pending claims are allowable over the cited references.

Claims 1 and 9

Claim 9 is directed to a spread-spectrum receiver comprising a variable attenuator, an analog-to-digital converter (ADC), an interference-compensation filter, a digital processor, and a controller. The variable attenuator selectively attenuates a received analog spread-spectrum signal to generate a selectively attenuated analog spread-spectrum signal. The ADC digitizes the selectively attenuated analog spread-spectrum signal to generate a digital spread-spectrum signal. The interference-compensation filter filters the digital spread-spectrum signal in an attempt to compensate for interference in the received analog spread-spectrum signal to generate a filtered digital spread-spectrum signal. The digital processor de-spreads the filtered digital spread-spectrum signal to generate a de-spread digital signal. The controller controls the variable attenuator based on the amplitude of the digital spread-spectrum signal prior to the interference-compensation filter and the digital processor.

Fig. 6 shows an exemplary embodiment of the spread-spectrum receiver of claim 9. As shown in Fig. 6 and as described in the text on page 3 of the specification:

- Mixer 604 downconverts analog input signal 602 from RF to IF;
- Variable attenuator 614 selectively attenuates analog IF signal 608 to generate an analog attenuated IF signal 616;
- ADC 618 converts the analog attenuated IF signal into a digital IF signal 620;
- Digital downconverter 624 downconverts digital IF signal 620 into a digital baseband signal 626;
- Digital filter 628 filters digital baseband signal 626 to generate filtered baseband signal 630;
- Digital processing 632 despreads and demodulates the filtered baseband signal 630; and
- Controller 612 determines the amplitude of digital IF signal 620 (prior to the filtering of digital filter 628 and the de-spreading of digital processing 632) and controls variable attenuator 614 based on that determined amplitude.

In light of these teachings, spread-spectrum receiver 600 of Fig. 6 may be said to be an exemplary embodiment of the spread-spectrum receiver of claim 9, where:

- Variable attenuator 614 of Fig. 6 is an example of the variable attenuator of claim 9;
- ADC 618 of Fig. 6 is an example of the ADC of claim 9;
- Digital filter 628 of Fig. 6 is an example of the interference-compensation filter of claim 9;
- Digital processing 632 of Fig. 6 is an example of the digital processor of claim 9; and
- Controller 612 of Fig. 6 is an example of the controller of claim 9.

Note that, as shown in Fig. 6, controller 612 controls variable attenuator 614 based on the amplitude of digital spread-spectrum signal 620 <u>prior to</u> digital filter 628 and digital processing 632.

Brueske teaches a radio frequency (RF) receiver for a spread-spectrum signal. Of most relevance to the Examiner's rejection of claim 1, in Fig. 3 of Brueske:

- Variable low noise amplifier (LNA) 301 amplifies the analog RF signal (see, e.g., column 3, lines 46-49);
- Variable dynamic range filters 315 and 317 variably control the dynamic range of each channel (see, e.g., column 4, lines 22-27);
- Variable resolution analog-to-digital (A/D) converters 319 and 321 digitize the analog signals from filters 315 and 317, respectively (see, e.g., column 4, lines 38-44);
- Digital filters 323 and 325 receive the digitized outputs of A/D converters 319 and 321, respectively, and control the desired digital frequency response of the digital data to attenuate channel interference (see, e.g., column 4, lines 63-67);
- Wideband detector 303 detects the presence of wideband on and off channel RF signals in the amplified analog signals generated by LNA 301 (see, e.g., column 3, lines 49-52);
- Off-channel detector 313 detects the presence of strong interfering off-channel RF signals in the downconverted analog signals generated by mixers 309 and 311 (see, e.g., column 4, lines 1-3);
- On-channel detector 327 processes the digital signals generated by digital filters 323 and 325 to detect the signal strength of the on-channel signals (see, e.g., column 5, lines 41-42); and
- AGC control 307 receives the signals generated by detectors 303, 313, and 327 and generates signals used to control the operations of LNA 301, mixers 309 and 311, analog filters 315 and 317, A/D converters 319 and 321, and digital filters 323 and 325 (see, e.g., column 4, lines 30-44, and column 5, lines 1-4).

In rejecting claim 1, the Examiner argued that:

- Brueske's LNA 301 is an example of the variable attenuator of claim 9;

- Brueske's A/D converters 319 and 321 are examples of the ADC of claim 9;

- Brueske's digital filters 323 and 325 are examples of the interference-compensation filter of claim 9; and

- Brueske's AGC control 307 is an example of the controller of claim 9.

In rejecting claim 9, the Examiner admitted, on page 5, that Brueske "does not teach digital processor adapted to de-spread the filtered digital spread-spectrum signal."

Although the Examiner did not explicitly admit it, there is another feature of claim 9 that Brueske does not teach. In particular, Brueske does not teach a controller that controls a variable attenuator based on the amplitude of a digital spread-spectrum signal prior to an interference-compensation filter.

As described above, Brueske's AGC control 307 receives signals generated by detectors 303, 313, and 327. Detectors 303 and 313 generate signals prior to filters 315, 317, 323, and 325, but those signals are generated based on analog spread-spectrum signals, not digital spread-spectrum signals, because those detectors receive analog signals that are upstream of A/D converters 319 and 321. Detector 327, on the other hand, generates signals based on digital signals, but those signals are after, not prior to filters 315, 317, 323, and 325. As such, Brueske teaches a controller (i.e., AGC control 307) that controls a variable attenuator (i.e., LNA 301) based on (1) analog spread-spectrum signals (i.e., from detectors 303 and 313) prior to an interference-compensation filter (i.e., filters 315, 317, 323, and 325) and (2) digital signals (i.e., from detector 327) after an interference-compensation filter (i.e., filters 315, 317, 323, and 325). Significantly, however, Brueske does not teach or even suggest a controller that controls a variable attenuator based on the amplitude of a digital spread-spectrum signal prior to an interference-compensation filter.

In rejecting claim 9, the Examiner argued that Younis discloses the features of claim 9 that are missing from Brueske. In particular, on page 5, the Examiner stated that "Younis discloses a digital signal processor for de-spreading the filtered digital spread-spectrum signal to generate a de-spread digital signal, wherein the attenuation determination is based on the amplitude of the digital spread-spectrum signal prior to the interference-compensation filtering and the de-spreading," citing column 4, lines 42-44, of Younis. For the following reasons, the Applicant submits that the Examiner mischaracterized the teachings of Younis in rejecting claim 9.

First of all, Younis does not teaches a digital signal processor for de-spreading a filtered digital spread-spectrum signal to generate a de-spread digital signal. In particular, Younis' demodulators 1130, 1250, and 1350 appear to generate the equivalent of the I and Q data generated by Brueske's digital filters 323 and 325. See, e.g., column 4, lines 5-14, for demodulator 1130 of Fig. 1; column 7, lines 25-57, for demodulator 1250 of Figs. 2 and 4; and column 8, lines 59-63, for demodulator 1350 of Fig. 3.

Even if Younis were to teach such a digital signal processor (which the Applicant does not admit), the fact remains that Younis does not teach that attenuation determination is based on the amplitude of a digital spread-spectrum signal prior to interference-compensation filtering and de-spreading. For example, in Younis' Fig. 2, AGC control circuit 1260 controls attenuator 1216 based on the baseband data output from demodulator 1250. Significantly, however, this baseband data is after bandpass filter 1226, which "filters the signal to remove spurious signal which can cause intermodulation products in the subsequent signal processing stages." See column 6, line 67, to column 7, line 3. Thus, Younis teaches a controller (i.e., AGC control circuit 1260) that controls a variable attenuator (i.e.,

attenuator 1216) based on a digital signal after, not prior to, an interference-compensation filter (i.e., filter 1226). Significantly, however, Younis does not teach or even suggest a controller that controls a variable attenuator based on the amplitude of a digital spread spectrum signal prior to an interference-compensation filter.

The Examiner cited column 4, lines 42-44 of Younis in support of the argument that Younis teaches such a controller. The Applicant submits that the cited passage in Younis is related to ADC 1410 in demodulator 1250 of Fig. 4; it is not related to AGC control circuit 1260 of Fig. 2 or AGC control circuit 1360 of Fig. 3.

Furthermore, the cited passage states: "The power detector measures the amplitude of the signal into the ΣΔ ADC." Since the signal "into" an analog-to-digital converter is by definition an analog signal, this passage cannot possibly be cited as teaching the amplitude of a digital spread-spectrum signal.

As such, even if it were proper for the Examiner to combine the teachings of Brueske and Younis, which the Applicant does not admit, the fact remains that such a combination would not provide all of the features explicitly recited in claim 9. In particular, the combination of Brueske and Younis would not provide a controller that controls a variable attenuator based on the amplitude of a digital spread spectrum signal prior to (1) an interference-compensation filter and (2) a digital processor adapted to de-spread a filtered digital spread-spectrum signal.

For all these reasons, the Applicant submits that claim 9 is allowable over the cited references. For similar reasons, the Applicant submits that claim 1 is allowable over the cited references. Since the rest of the claims depend directly or indirectly from claims 1 and 9, it is further submitted that those claims are also allowable over the cited references.

New Claim 20

According to new claim 20, the received analog spread-spectrum signal is (1) attenuated when the amplitude of the digital spread-spectrum signal is greater than a first threshold and (2) not attenuated when the amplitude of the digital spread-spectrum signal is less than a second threshold, where the first threshold is greater than or equal to the second threshold. A transition from the received analog spread-spectrum signal not being attenuated to the received analog spread-spectrum signal being attenuated occurs after the amplitude of the digital spread-spectrum signal is greater than the first threshold for a first specified amount of time. Similarly, a transition from the received analog spread-spectrum signal being attenuated to the received analog spread-spectrum signal not being attenuated occurs after the amplitude of the digital spread-spectrum signal is less than the second threshold for a second specified amount of time.

Support for new claim 20 is found, for example, in original claim 4 and on page 4, lines 12-14, of the Specification. None of the cited references teaches or even suggests the combination of features of new claim 20. As such, the Applicant submits that this provides additional reasons for the allowability of new claim 20 over the cited references.

New Claim 21

According to new claim 21, the attenuation determination is further based on *a priori* knowledge of maximum expected interference-to-carrier ratio. Support for new claim 21 is found, for example, on page 6, lines 19-22, of the Specification. None of the cited references teaches or even suggests the

combination of features of new claim 21. As such, the Applicant submits that this provides additional reasons for the allowability of new claim 21 over the cited references.

Conclusion

For the reasons set forth above, the Applicant respectfully submits that the rejections of claims 1-19 under Section 103(a) have been overcome. In addition, new claims 20-21 patentably define over the cited references.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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Customer No. 22186
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Steve Mendelsohn/
Steve Mendelsohn
Registration No. 35,951
Attorney for Applicant
(215) 557-6657 (phone)
(215) 557-8477 (fax)